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Case No.: 48924US031  
F&R Docket No.: 18055-001001

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Applicant : Kenneth L. Smith  
Serial No. : 10/039,103  
Filed : January 4, 2002

Art Unit : 2872  
Examiner : James Phan

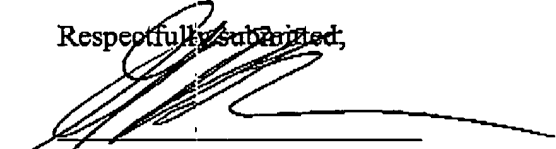
Title : Flexible Cube Corner Retroreflective Sheeting

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Attached to this facsimile communication cover sheet is a Reply Brief (6 pages), faxed this 17th day of October, 2005, to the United States Patent and Trademark Office.

Respectfully submitted,

Date: October 17, 2005

  
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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, Applicant responds to the Examiner's Answer of August 17, 2005, as follows. As explained more fully below, the Examiner's Answer has made it evident that the pending obviousness rejection is premised upon an erroneous claim construction. Whereas the claims specifically recite that the cube corners are formed in a surface of a polymeric material and that there is an "air interface at the cube corner elements," the Examiner is interpreting the claims to cover products in which there is no air at the boundary of the cube corner elements. Moreover, there was no motivation to combine the asserted references in the first instance because doing so would significantly deteriorate the retroreflective performance of the sheeting.

**The Examiner's Answer**

The Examiner maintains the rejection of claims 41-42, 45-57 and 49-59 under 35 U.S.C. §103 as being obvious over Phillips '586 or Phillips '222 in view of Reflexite's Response and further in view of McGrath. The Examiner acknowledges that Phillips lacks layers having the recited elastic moduli and "a seal film applied to the cube corner elements to maintain [sic; an]

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air interface at the cube corner elements.” (*Examiner’s Answer at 4*) The Examiner acknowledges that Phillips in view of Reflexite’s Response lacks “a seal film applied to the cube corner elements to maintain [sic; an] air interface at the cube corner elements.” (*Id. at 5*) The Examiner maintains that one skilled in the art would have been motivated to apply the seal film of McGrath to the Phillips/Reflexite combination. (*Id. at 6*)

Significantly, the sheeting of the proposed combination has cube prism elements which are *metallized*. The Examiner asserts the following combination: the sheeting of FIG. 1 of Phillips, which has a reflective coating 26 (typically aluminum, silver or gold according to the reference at col. 4, lines 34-36), modified to have the elastic moduli set forth in Reflexite’s Response and further modified by applying the seal film of McGrath. In his Answer the Examiner acknowledges that this proposed combination has metallized cubes, noting that “the retroreflective sheetings disclosed in Phillips do not need air interface for retroreflecting incident light because the incident light is retroreflected by the reflective coating (26 in Fig. 1 or 54 in Figs. 2C and 3C).” (*Examiner’s Answer at 8*) Accordingly, there is no dispute that the sheeting of the proposed combination has metal, not air, at the boundary of the polymeric cube corner elements.

The Examiner proceeded to find that one skilled in the art would be motivated to apply the seal film of McGrath rather than an elastomeric film that filled all of the space between the cube corner elements (as in FIGS. 2A-2C and 3A-3C of Phillips) because the former approach would be significantly cheaper. (*Examiner’s Answer at 8-9*) In so finding, the Examiner noted that applying the seal film of McGrath to the metallized sheeting of the Phillips would “provide[] [an] air interface at the cube corner elements [that] would significantly reduce the material use for the film.” (*Id. at 8, emphasis added*)

It is thus clear to Applicant that the Examiner is reading the claims so as to cover sheeting in which there is no air at the boundary of the polymeric cube corner elements, but rather only an air interface at the metal coating which is on top of the cube corner elements.

### **The Examiner is Misinterpreting the Claims**

Both of the appealed independent claims specifically recite that the cube corners are formed in a surface of a polymeric layer and that the cube corners are exposed to air.

Independent claim 45 recites, in pertinent part, “a second layer . . . having a third major surface

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and having a surface opposite the third major surface in which cube corner elements are formed, wherein the cube corner elements are exposed to air; and a seal film applied to the cube corner elements to maintain an air interface at the cube corner elements." Similarly, independent claim 52 recites "a second layer . . . having a third major surface . . . , the second layer also having the cube corner elements formed on a surface opposite the third major surface" and "a seal film applied to the cube corner elements to maintain an air interface at the cube corner elements." The claims thus expressly require that an "air interface" exist at the cube corners formed in the polymeric surface.

The term "interface" means the boundary of the cubes formed in the polymeric layer. The Merriam Webster dictionary defines *interface* as "a surface forming a common boundary of two bodies," and that is consistent with the Applicant's use of the term throughout the specification as filed.

Accordingly, the claims require an *air interface at the boundary of the cube corner elements*.

#### **The Proposed Combination Lacks an Air Interface at the Boundary of the Cube Corner Elements**

As noted above, there appears to be no dispute that the sheeting of the proposed combination has metal, not air, at the boundary of the polymeric cube corner elements. The question, then, is whether the reflective coating 26 of Phillips could somehow be properly considered part of the recited "cube corners elements."

It cannot. The claims recite a "second layer" that includes cube corner elements formed in a surface of that layer. Anything that is considered part of the cube corner elements must also be part of that "layer." However, the retroreflective coating 26 is described and depicted as a separate and discrete layer from the prism array 14. Phillips teaches that the reflective coatings are formed on top of the prism array in a separate sputtering or vacuum metallization step. (*Phillips '586 at col. 4, 34-36*). The coating of Phillips is accordingly not part of the "second layer" and thus cannot be part of the "cube corner elements."

This construction of "layer" is consistent with that adopted by the Federal Circuit in *AFG Indus., Inc. v. Cardinal IG Co.*, 239 F.3d 1239, 1250 (Fed. Cir. 2001). There, the Court construed a claim that recited a "[a] transparent laminated product comprising . . . a 5-layered

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transparent coating composed of a first ZnO layer formed on the substrate, a second Ag layer formed on the first layer, a third ZnO layer formed on the second layer, a fourth Ag layer formed on the third layer and a fifth ZnO layer formed on the fourth layer." The Court held that the term "layer" meant "*a thickness of material of substantially uniform chemical composition, but excluding interlayers having a thickness not to substantially affect the optical properties of the coating.*"

Here, the retroreflective coating of Phillips has neither a composition which is substantially the same as the cube corner elements nor a thickness which renders it optically insignificant (to the contrary, it is intended to have a substantial retroreflective effect).

Accordingly, the sheeting of the proposed combination does not meet the limitations of independent claims 45 or 52 because the retroreflective coating 26 of Phillips cannot be part of the recited "second layer" and thus the sheeting of the proposed combination lacks an "air interface" at the cube corner elements formed in the second layer.

#### **There Is No Other Basis for Sustaining the Examiner's Rejection**

The Examiner has identified no prior art which teaches removal of the retroreflective coating 26 in Phillips. Nor has the Examiner even suggested that there might be any motivation to do so. The Applicant thus respectfully submits that the obviousness rejection must be overturned.

#### **The Examiner Also Erred in Finding that there was a Motivation to Apply the Seal Film of McGrath to the Phillips Sheeting**

In its Appeal Brief Applicant explained that if seal film were applied to the sheeting of Phillips as taught in McGrath (i.e., by intermittent thermoformed bonds), the primary functionality of the Phillips sheeting (i.e., the ability of the prism array to crack and split along the valleys when minimal tensile force is applied so the prisms remain in position and in the correct orientation on the elastomeric film when the sheeting is in a stretched state) would be disrupted due to the "nonuniformly [] distributed tensile force[s]." (*Appeal Brief at 6*)

In his Answer the Examiner reasoned that the seal film of McGrath would not interfere with the aforementioned functionality because the total *area* of the bonds would be small. (*Examiner's Answer at 10*) The Answer states that Phillips teaches one embodiment (FIG. 2C)

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in which an elastomeric film 44 fills in all of the area in between every cube prism and the McGrath "bonding areas is [sic; are] are much less than that [this embodiment] of Phillips." (*Examiner's Answer at 10*) From this the Examiner concluded that the "bonding network associated with the seal film (McGrath FIG. 1) would not affect to [sic] the splitting behavior between the cube corner prism elements." (*Id.*)

However, it is not the *area* of the bonds but their *nonuniformity* which gives rise to the deterioration in retroreflective performance. The fact that the bonds of McGrath are intermittent translates to uneven distribution of stresses amongst the layers of the sheeting. In the cube corner sheeting of the proposed combination those uneven stresses would cause the cubes to deflect from their reflective orientations, especially near the bonding areas. This need for uniformity in stress distribution is clearly seen in the very embodiment relied upon the Examiner. The reason Phillips teaches only a *uniform* elastomeric film 44 is that such uniformity is necessary to preserve the ability of the prism array to crack and split along the valleys when minimal tensile force is applied so the prisms remain in position and in the correct orientation on the elastomeric film when the sheeting is in a stretched state.

Accordingly, Applicant submits that the Examiner erred in finding that those skilled in the art would be motivated to apply the seal film of McGrath to the Phillips sheeting. Such a combination would have been clearly understood to be undesirable, a fact which the Phillips reference itself reinforces by teaching only embodiments in which stresses would be distributed evenly amongst separated cube corner elements.

Separately, Applicant provided in its Appeal Brief a detailed argument to the effect that one skilled in the art would *not* have readily known how to bond the seal film of McGrath to the prism array of the Phillips. (*Appeal Brief at 7*)

In response, the Examiner merely noted that he found no "teachings [in Bernard et al.] that would not motivate one of ordinary skill from applying the teaching of McGrath in Phillips" and referenced his position that McGrath teaches less bonding area and thus allegedly would not adversely affect the retroreflective performance of the Phillips sheeting.

However, McGrath teaches no embodiment in which the prism array cracks along the valleys between cube corner elements, such as the Phillips sheeting. That situation presents special challenges, as explained in U.S. Patent 6,143,224 to Bernard et al. Such a prism array does not provide a stable surface against which to weld, and the cubes typically dislocate. The

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cubes thus "form a barrier to the weld[]" (col. 4, lines 44-46) rather than being the layer against which the weld is made, as taught in McGrath.

Accordingly, those skilled in the art would have understood that the particular teachings of McGrath could *not* be applied directly to the sheeting of Phillips. There was no motivation to combine McGrath with Phillips in the manner alleged by the Examiner.

### Conclusion

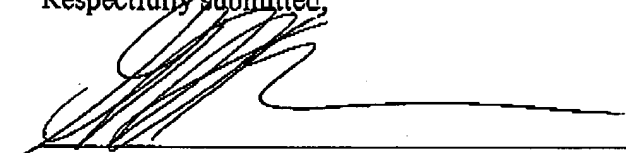
Because the Examiner erred in finding that that the sheeting of the proposed combination met the limitations of the claims and further erred in finding a motivation to make the proposed combination in the first instance, Applicant submits that the final obviousness rejection should be reversed.

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Date: \_\_\_\_\_

10/17/05

Respectfully submitted,



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